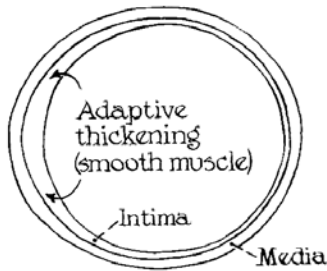
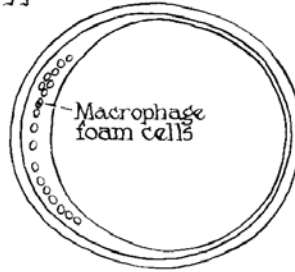


# 9. Atherosclerosis-Pathogenesis

Coronary artery at lesion-prone location



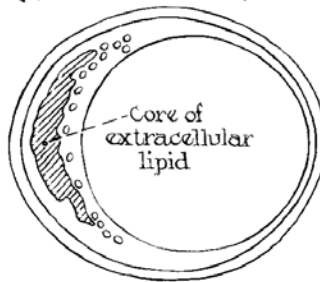
Type II lesion



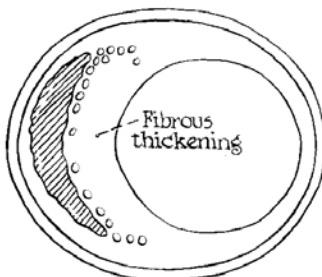
Type III (preatheroma)



Type IV (atheroma)



Type V (fibroatheroma)

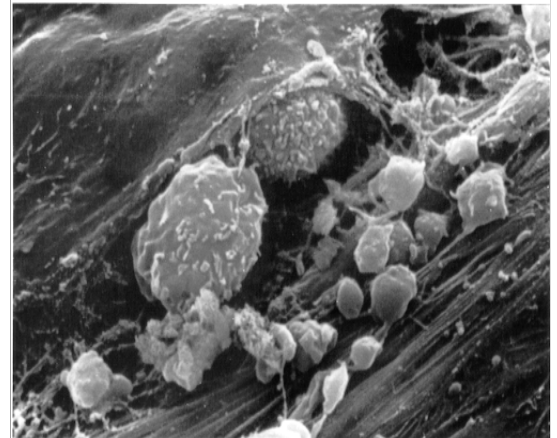


Type VI (complicated lesion)



## Coronary Atheroma-Infectious?

- Fluorescein labeled Antibodies to Chlamydia antigen in coronary plaque Organism in 79% of atheroma 4% normal vessels Muhlestein, JACC 1996
- Antibiotics reverse plaques in rabbits Muhlestein, Cir 1998
- Nanobacteria, *Nanobacterium sanguineum*,



Monocytes under Endothelial

## Atheroma Ossification not Calcification (1863)

- v Calcification in Atherosclerosis is similar if not identical to calcification seen in Ghon Complex of Tuberculosis.
- v Initial calcification leads to formal lamellae bone with osteoclasts and osteoblasts, even marrow appears!
- v Heavily Calcified Coronaries are due to dense chronic Osteoclastic remodeling.

Virchow, 1863

| Nomenclature and main histology  | Sequences in progression  | Main growth mechanism                           | Earliest onset     | Clinical correlation       |
|--|---|---|--------------------|----------------------------|
| <b>Type I (initial) lesion</b><br>isolated macrophage foam cells   | <pre> graph TD     I((I)) --&gt; II((II))     II --&gt; III((III))     III --&gt; IV((IV))     IV --&gt; V((V))     V --&gt; VI((VI))     IV --&gt; VI             </pre> | growth mainly by lipid accumulation             | from first decade  | clinically silent          |
| <b>Type II (fatty streak) lesion</b><br>mainly intracellular lipid accumulation  |   |   |                    |                            |
| <b>Type III (intermediate) lesion</b><br>Type II changes & small extracellular lipid pools   |   |   |                    |                            |
| <b>Type IV (atheroma) lesion</b><br>Type II changes & core of extracellular lipid  |   |   | from third decade  |                            |
| <b>Type V (fibroatheroma) lesion</b><br>lipid core & fibrotic layer, or multiple lipid cores & fibrotic layers, or mainly calcific, or mainly fibrotic |   | accelerated smooth muscle and collagen increase | from fourth decade | clinically silent or overt |
| <b>Type VI (complicated) lesion</b><br>surface defect, hematoma-hemorrhage, thrombus   |   | thrombosis, hematoma                            |                    |                            |